

REMARKS

After entry of this Amendment and Response, claims 1, 2, 4, 5, 7, 9–11, 13–19, 22–24, 76, 78, 80, 82, and 83 will be pending in this application. Claims 3, 6, 8, 12, 20, 21, 25–75, 77, 79, 81, and 84–87 are cancelled, and claims 1, 4, 5, 10, 11, 13, 16, 19, 76, 78, 80, 82, and 83 have been amended to clarify the scope of those claims. Support for the amendments may be found, for example, in the originally filed claims, and in the specification, e.g., paragraph [0076]. No new matter has been added.

Rejection of claims under 35 U.S.C. 102(b)

Claims 1–25, 40, 60, 76, 78, 80, 82 and 83 are rejected under 35 U.S.C. 102(b) as anticipated by U.S. Patent No. 5,387,380 to Cima et al (“Cima”). The rejection of claims 3, 6, 8, 12, 20, 21, 25, 40 and 60 is moot in view of the cancellation of those claims.

Cima appears to disclose a process for making a component from a powder material by three-dimensional printing. *See* title, abstract. To the limited extent Cima describes the composition of the powder material, Cima merely states that the powder material may be a ceramic, metal, or plastic powder or fiber. *See* column 12, lines 11–21.

Cima, however, does not disclose any thermoplastic particulate materials, including any of the thermoplastic materials recited in amended independent claims 1 and 83.

Furthermore, Cima does not teach a loose and free-flowing particulate mixture including an adhesive particulate material in combination with any particulate material (and certainly not with thermoplastic particulate material), as required by independent claims 1, 76, 78, 80, and 83. In fact, Cima does not disclose alone or in combination any adhesive particulate material. Rather, Cima apparently relies primarily on the application of a liquid binder material to selectively bind his powder. *See* column 3, lines 2–14. For example, Cima suggests using a solvent binder or a plastic binder, e.g., a low viscosity epoxy plastic material in combination with a plastic powder. *See* column 12, lines 11–19. In some applications, binder materials may comprise binder particles entrained in a liquid. *See* column 11, lines 49–51. In other embodiments, the binder may be applied in a dry state using materials having a low melting

point, and subsequently melted. *See* column 14, lines 21–28. In no circumstance does Cima contemplate a loose and free-flowing particulate mixture including a thermoplastic particulate material and an adhesive particulate material, as recited in amended independent claims 1, 76, 78, 80, and 83.

Moreover, Cima also does not disclose applying to a printed layer of thermoplastic particles at least one of an ultraviolet light, visible light, or an electron beam, as recited in amended independent claims 82.

Applicants submit that for at least these reasons, independent claims 1, 76, 78, 80, 82, and 83, and claims dependent therefrom, are patentable over the cited art.

Claims 1–25, 40, 60, 68, 76, 78, 80, 82, and 83 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,902,441 to Bredt et al (“Bredt”). The rejection of claims 3, 6, 8, 12, 20, 21, 25, 40, 60, and 68 is moot in view of the cancellation of those claims.

Bredt appears to describe three-dimensional printing materials systems. *See* abstract. Various powder components are described. *See* column 7, line 40 – column 9, line 12. Bredt mentions plastic powders only with reference to the prior art. *See* column 1, line 65 and column 2, line 32. In one instance, the plastic powder is sintered with a laser. *See* column 2, lines 1–4. In the other instance, i.e., with reference to the parent (U.S. Patent No. 5,204,055) of the Cima patent, the plastic powder is bound by a liquid binder. *See* column 2, lines 14–34. In neither case is there any disclosure or suggestion of the plastic powder being mixed with an adhesive particulate material.

Bredt does not disclose thermoplastic particulate materials, as recited in the instant claims. More particularly, Bredt does not disclose a powder including a thermoplastic particulate material and an adhesive particulate material, as recited in amended independent claims 1, 76, 78, 80, and 83.

The Examiner states that Bredt discloses an article made of a mixture of particles of an adhesive and a filler. As detailed above, Applicants respectfully submit, however, that Bredt does not disclose the mixture of particles of the adhesive particulate material and the thermoplastic particulate material recited in amended claims 1, 76, 78, 80, and 83. The fillers

taught by Bredt may be selected from the same general groups as the adhesives are selected. See column 8, lines 32–38. None of the thermoplastic particulate material listed in the instant claims, however, appear in the examples of adhesives provided by Bredt.

Furthermore, the Examiner states that specific examples of polymers that are listed in Bredt in Column 8 are identical to the ones claimed in the instant application. Applicants respectfully submit that none of the materials listed in column 7, line 60 – column 8, line 13, including adhesives, fillers, and starches, are included in the lists of thermoplastic materials recited in amended independent claims 1, 76, 78, 80, and 83. Moreover, none of the thermoplastic materials listed in claims 1, 76, 78, 80, and 83 are taught or suggested by Bredt.

Bredt also does not disclose applying to a printed layer at least one of an ultraviolet light, visible light, and an electron beam, as recited in amended independent claims 82.

Applicants submit that for at least these reasons, amended independent claims 1, 76, 78, 80, 82, and 83, and claims dependent therefrom, are patentable over the cited art.

Advantages of thermoplastic particulate material in 3D printing

Both references cited by the Examiner recite plastic powder, but neither reference teaches or suggests a particulate mixture comprising a thermoplastic particulate material and an adhesive particulate material. Applicants note that, as stated in the specification, thermoplastic particulate materials provide specific advantages when used in three-dimensional printing. The term "thermoplastic particulate material" refers to a filler component that is bonded when the adhesive particulate material is activated by a fluid, the component including a material that may be repeatedly softened by heating and hardened again on cooling. Embodiments of the claimed invention include thermoplastic particulate material that allows the fabrication of appearance models and functional parts that are accurately defined, are strong and tough without being brittle, and have smooth surface finishes with, optionally, thin walls. Because thermoplastic materials are used for engineering and consumer products, these materials are particularly attractive for 3D prototyping, as they are typically also used in the final manufacturing method. See paragraphs [0012] and [0069].

Rejection of Claims - Double Patenting

Claims 76, 78, 80, and 82 are rejected under the judicially created doctrine of obviousness-type double patenting over claims 1–26 of Bredt. Bredt discloses three-dimensional printing materials systems, but does not teach or suggest the claimed combination of thermoplastic and adhesive materials. In fact, Bredt does not even mention the thermoplastic materials recited in amended claims 76, 78, and 80. Moreover, Bredt does not teach or suggest applying at least one of an ultraviolet light, visible light, or an electron beam to a printed layer including a thermoplastic particulate material, as recited in amended claim 82.

Applicants submit that, for at least these reasons, claims 76, 78, 80, and 82 are patentable over Bredt and would not have been obvious based on Bredt at the time of the filing of the instant application.

CONCLUSION

In light of the foregoing, Applicants respectfully submit that all claims are in condition for allowance.

A petition for a three -month extension of time is enclosed; the Commissioner is hereby authorized to charge \$1020 for the late fee to Deposit Account No. 07-1700. Applicants believe that no other fees are necessitated by the present Response. However, in the event that any additional fees are due, the Commissioner is hereby authorized to charge any such fees to Deposit Account No. 07-1700.

If the Examiner believes that a telephone conference with Applicants' attorney would expedite allowance of this application, the Examiner is cordially invited to call the undersigned attorney at (617) 570-1806.

Respectfully submitted,

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